USER'S GUIDE

Installation & Operation Instructions

Doppler Flow Meter

Model UF D5000

Manual Series B.8.10

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Available in Adobe Acrobat pdf format

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IMPORTANT NOTE: This instrument is manufactured and calibrated to meet product specifications. Please read this manual carefully before installation and operation. Any unauthorized repairs or modifications may result in a suspension of the warranty.

If this product is not used as specified by the manufacturer, protection may be impaired.

CONNECTIONS:

POWER INPUT: The standard model requires AC power input between 100 to 240 VAC 50/60Hz . No adjustments are necessary for voltages within this range. Connect L (Live) N (Neutral) and AC Ground.

Optional DC input model requires 9-32 VDC/9 Watts. Connect to + and - terminals.

Optional Thermostat and Heater modules are available rated for 115 VAC or 230 VAC.

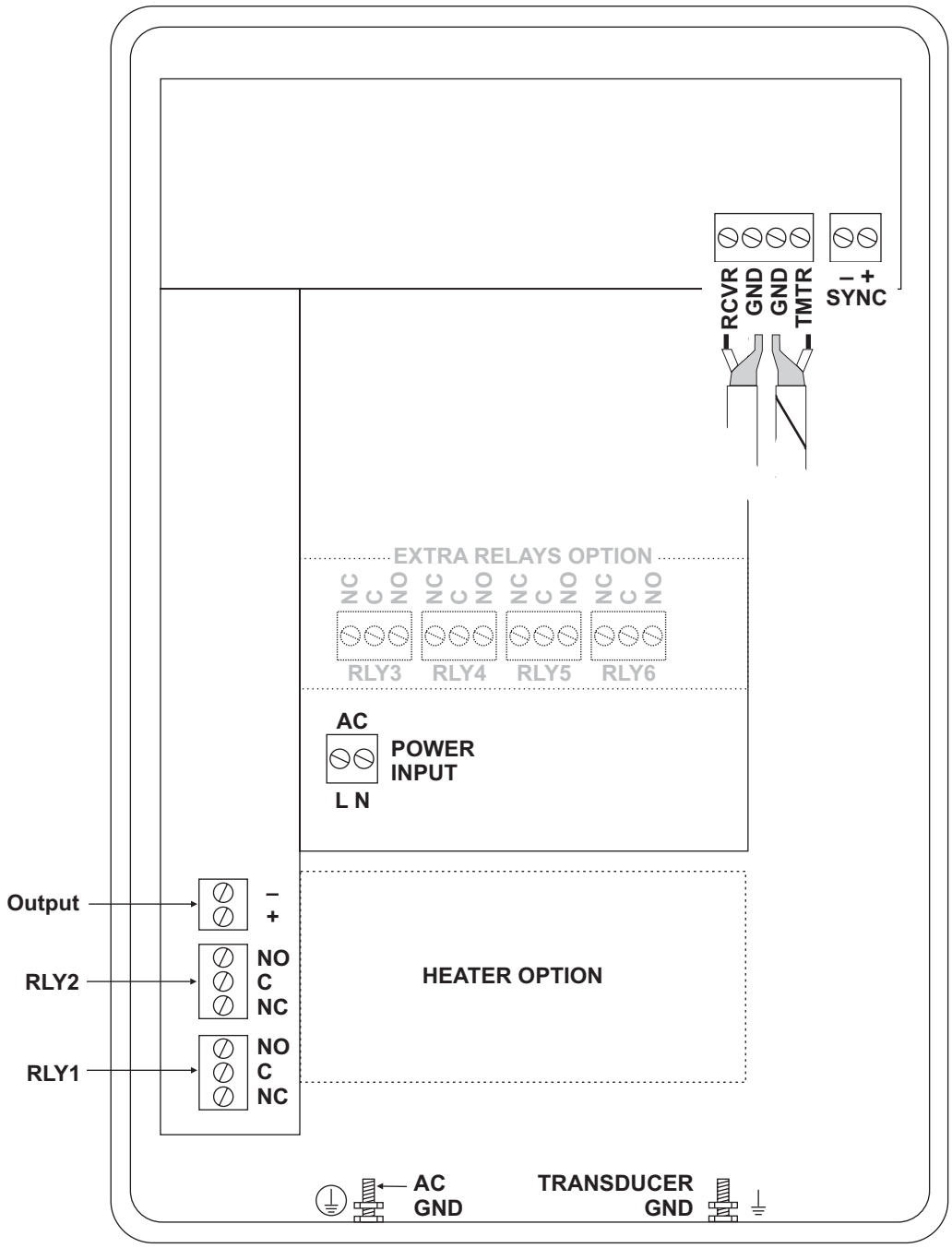
IMPORTANT NOTE: AC power input and relay connection wires must have conduit entry to the instrument enclosure. Installation requires a switch, overcurrent fuse or circuit breaker in the building (in close proximity to the equipment) that is marked as the disconnect switch.

Risk of electric shock. Loosen cover screw to access connections. Only qualified personnel should access connections.

Note: Use of instrumentation over 40°C ambient requires special field wiring.

Note: User replaceable fuse is 2 Amp 250V (T2AL250V).

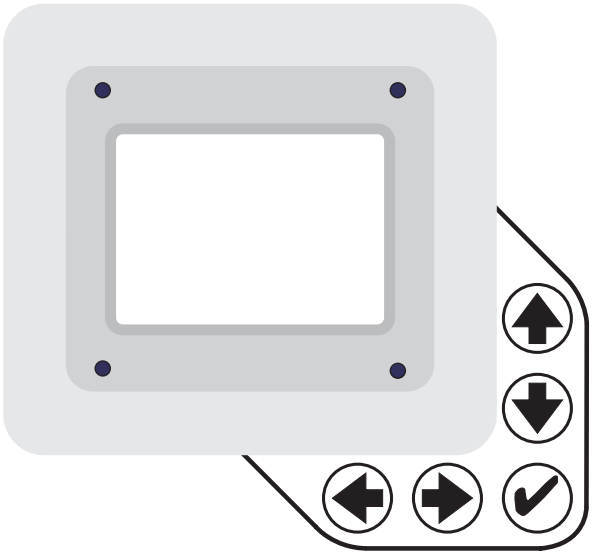
CONNECTIONS



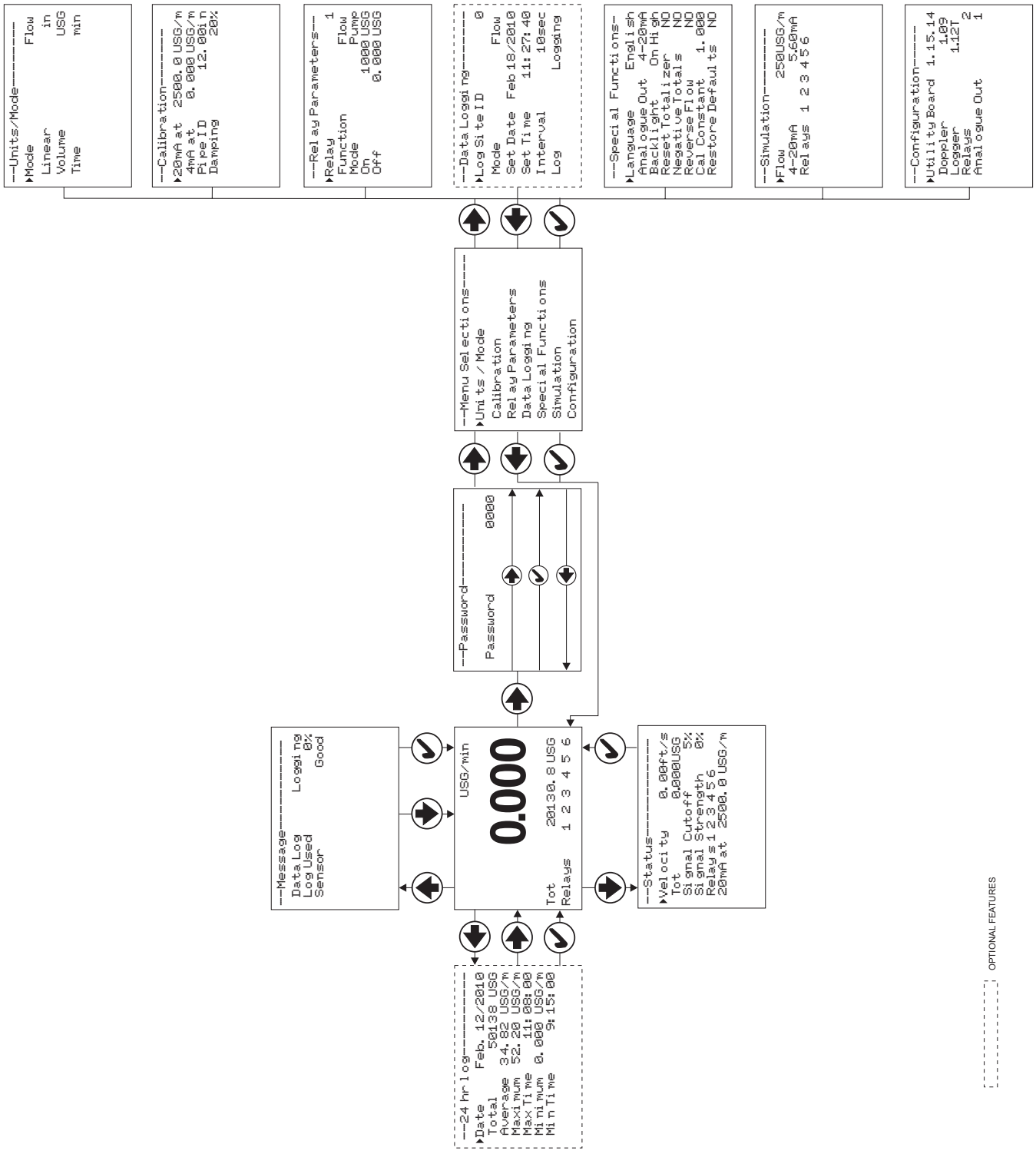
KEYPAD SYSTEM

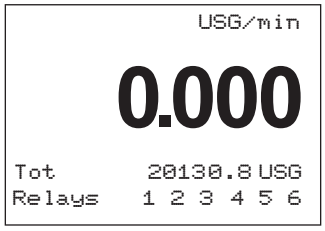
The following diagram shows the UF D5000 menu system. Arrows show the four directions to leave a menu box. Pressing a corresponding keypad arrow will move to the next item in the direction shown. Move the cursor (underline) under numerals and increase or decrease numerals with the ⬆ and⬇keys.

To store calibration values permanently (even through power interruptions), press the ✓.



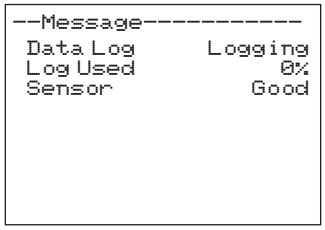
CALIBRATION MENU





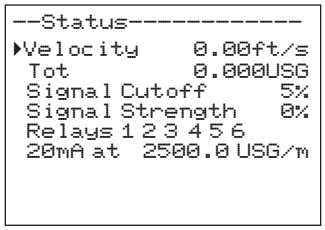
RUN

The main display shows the units selected from the Units/Mode menu, Flow or Velocity rate being measured, TOTALIZER and RELAY states. The UF D5000 will start-up with this display and will return to this screen after a timeout if keys are not pressed in other menus.



MESSAGE

Press ⬆ from the RUN display to view status of the data logger and error/warning messages provided by the instrument. The word Message will appear on the RUN display if error messages are being generated by the instrument. Refer to the manual section Error/Warning Messages for a description. Press ✓ to return to the main display.



STATUS

Press ⬇ from the RUN display to view instrument status. Velocity will be displayed in ft/sec or m/sec.

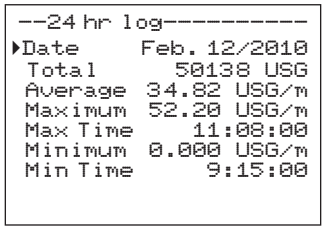
Tot Displays the current totalizer reading.

Signal Cutoff Adjust the setting in percent to suppress flow readings at zero flow when fluid swirling or pipe vibration may cause the instrument to continue reading. Example: Signal Cutoff at 5% will force the display and outputs to zero when signal strength drops below 5%.

Signal Strength Displays percentage of signal being received by the ultrasonic sensor.

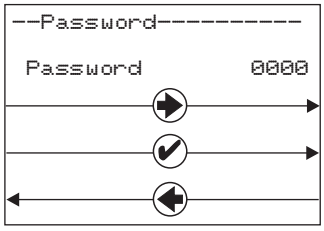
Relays Energized relays will display as a white character on a black background.

20mA at Displays the flow rate set as 20mA in the Calibration menu. Press ✓ to return to the main display.



24 HR LOG (Data Logging option only)

Press ⬅ from the RUN display to view a formatted flow report from instruments with a built-in data logger. Press ⬇ to scroll down one day or repeatedly to scroll to a specific date. Up to 365 days can be stored. Newest date will overwrite the oldest. Press ✓ to return to the main display.



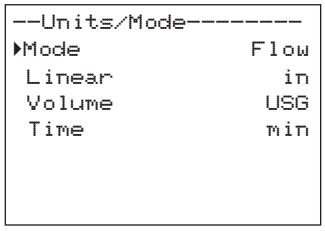
PASSWORD

The password (a number from 0000 to 9999) prevents unauthorized access to the Calibration menu.

From the Run display press the ➡ key to get to Password. Factory default password is 0000 and if it has not been changed press the ✓ to proceed to the Menu Selections screen.

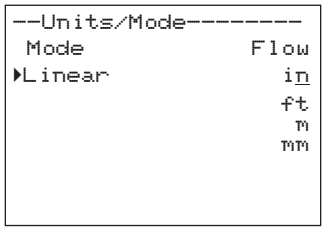
If a password is required, press ➡ to place the cursor under the first digit and ⬇ or ⬆ to set the number, then ➡ to the second digit, etc. Press ➡ or ✓ to proceed to the Menu Selections screen.

A new password can be stored by going to Special Functions/New Password.



UNITS/MODE

From ▸Modepress the ➡ and then the ⬆ or ⬇ to selectFlowor Velocity. Flow mode displays the flow rate in engineering units (e.g. gpm, litres/sec, etc.) Press the ✓to store your selection then the ⬇ to the next menu item and ➡ to enter.

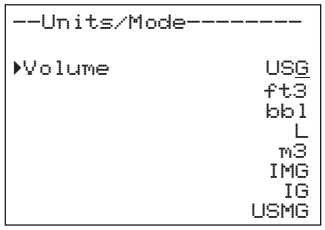


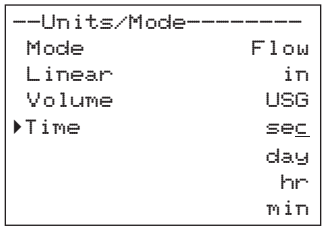
From ▸Linearpress the ➡ key and then the ⬆ or ⬇ to select your units of measurement. Press the ✓to store your selection.

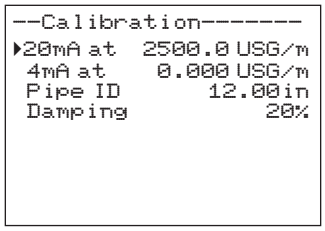
Press the ⬇ key to move the ▸symbol to each subsequent menu item and the ✓ to save your selections.

Note: the volume selection "bbl" denotes U.S. oil barrel.

Press ⬅ or ✓ to return to the Menu Selections screen.







CALIBRATION

Press the ⬇to▸Calibration and ➡ to enter. Use ⬇ or ⬆ to position ▸ before each menu item and ➡ to enter. When settings are completed press ✓ to store and return to the Calibration menu

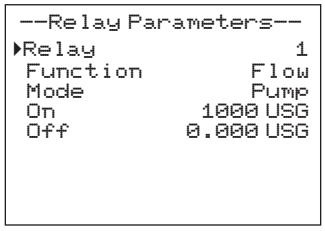
20mAatPress ➡ then ⬇ or ⬆ to change the numbers and decimal point. Use this menu to set the corresponding flow rate that will be represented by 20mA analog output. If maximum flow is unknown, enter an estimated flow rate and observe actual flow to determine the correct maximum value. Any velocity or flow rate up to +12.2 m/sec (40 ft/sec) may be selected.

4mA at Press ⬇ or ⬆ to set the flow rate corresponding to 4mA analog output. This setting may be left at zero flow (or velocity or can be raised to any value less than the 20mA setting, or lowered to any velocity or corresponding flow rate down to -12.2 m/sec (-40 ft/sec).

Pipe ID Place the cursor under the digits and then ⬇ or ⬆ to change the numbers and decimal point. Pipe IDshould be entered as the exact inside diameter of the pipe where the sensor is mounted. Refer to the Pipe Charts Appendix in this manual for inside diameter of common pipe types and sizes.

Damping -Increase damping to stabilize readings under turbulent flow conditions. Decrease for fast response to small changes in flow. Damping is shown in percentage (maximum is 99%). Factory default is 20%.

Press ✓ from the Units/Mode display to return to Menu Selections.



RELAY PARAMETERS

Relay — Press ➡ and ⬇ or ⬆ to select a corresponding relay number (2 relays are standard, 4 additional are optional).

Function — Press ⬇ or ⬆ to select Off, Pulse or Flow.

Flow — Mode Select Pump, Low Alarm or Hi Alarm.

Pump mode provides separate On/Off settings where the relay will energize at one flow rate and de-energize at another.

On Position the cursor under the numerals and press ⬇ or ⬆ to set digits to the required relay On set point.

Off set digits to the required Offset point.

Low Alarm mode relay will energize at a programmable flow rate and remain energized with flow below the set point. When flow rises above the set point, the relay will de-energize.

Hi Alarm mode relay will energize at a programmable flow rate and remain energized with flow above the set point. When flow falls below the set point, the relay will de-energize.

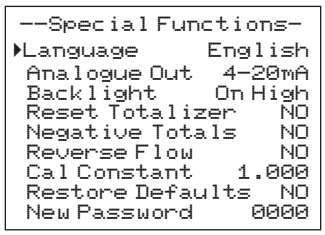
Pulse — Press ⬇ and set digits to the flow volume increment required between relay pulses. Use this feature for remote samplers, chlorinators or totalizers. Minimum time between pulses is 2.25 seconds and pulse duration is 350 milliseconds.

Return to Relay and change settings for each relay number.

Press ✓ to return to Menu Selections.

DATA LOGGING (OPTIONAL)

Refer to Options section of this manual.

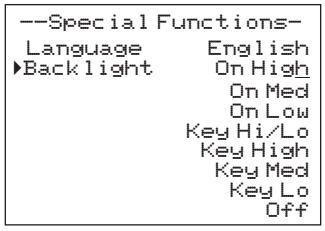


SPECIAL FUNCTIONS

LanguageSelect English, French or Spanish

Analogue OutSelect 4-20mA or 0-5V mode for the analogue output.

BacklightSelect On High,Medium or Low for continuous backlight.



Select KeyHi/Lo for high backlight for 1 minute after a keypress and then Lobacklight until a key is pressed again.

Select KeyHigh, Medor Low for backlight for 1 minute after a keypress and then backlight off until a key is pressed again.

Reset TotalizerPress ➡ and select Yes to erase and restart the totalizer at zero.

Negative Totals Select Yesto have reverse flow readings deducted from the totalizer. Select No to totalize forward flow only and ignore reverse flow.

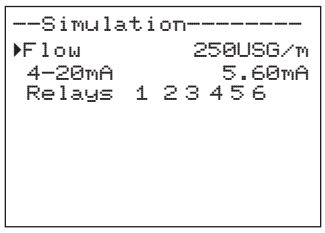
Reverse Flow SelectYes to change the display from positive or negative values (e.g. sensor mounted in a direction that shows normal flow as negative values. Use Reverse Flow to change readings to positive values.)

Cal ConstantSet to 1.000 for SE4-A transducer and QZ02L.

Restore DefaultsSelect Yesand press ✓ to erase all user settings and return the instrument to factory default settings.

New PasswordSelect any number from 0000 to 9999 and press ✓. Default setting of 0000 will allow direct access to the calibration menus. Setting of any password greater than 0000 will require the password to be entered to access the calibration menus.

Press ✓ to return to Menu Selections.



SIMULATION

Exercises the 4-20mA output, digital display and control relays (does not affect the totalizer or optional data logger).

Simulate a Flow /Velocity reading. Press ➡ and then ⬇ or ⬆ to change the simulated output. Press ✓ to begin simulation. The 4-20mA output and relay states will be displayed on the screen below.

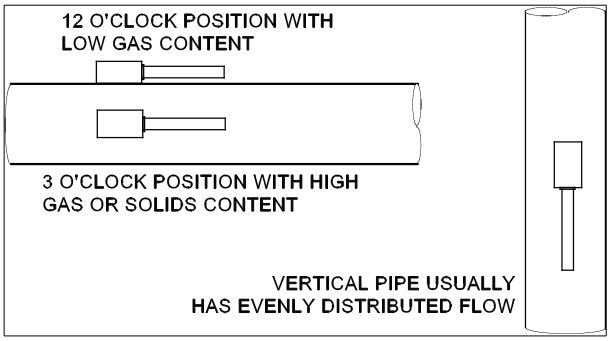
Press the ✓ to terminate simulation and return to the Menu Selections screen.

SENSOR MOUNTING LOCATION

The position of the sensor is one of the most important considerations for accurate Doppler flow measurement. The same location guidelines apply to Doppler as most other types of flow meters.

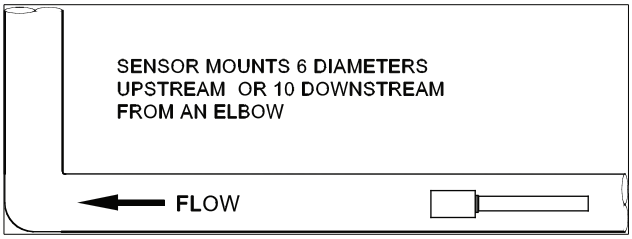
Before permanently mounting a Doppler sensor onsite testing is recommended to determine optimum mounting position. Use the sensor coupling compound (supplied with each Micronics flow meter, or petroleum gel, acoustic compound or electrocardiograph gel). Take several readings around the axis of the pipe and then at several points upstream and downstream from the selected position, checking for consistent readings. Avoid high or low reading areas. Mount the sensor where consistent (average) readings were obtained or continue testing on another pipe section.

VERTICAL OR HORIZONTAL PIPE - Vertical pipe runs generally provide evenly distributed flow. On Horizontal pipes and liquids with high concentrations of gas or solids, the sensor should be mounted on the side (3 or 9 o'clock position) to avoid concentrations of gas at the top of the pipe, or solids at the bottom. For liquids with minimal gas bubbles (e.g. potable water) the sensor should be mounted on the top of a horizontal pipe (12 o'clock position) to obtain the best signal strength.



VELOCITY INCREASING DEVICES: Generally the sensor must be mounted away from flow disturbances such as valves, pumps, orifice plates, venturis or pipe inlets and discharges which tend to increase flow velocity. Velocity increasing devices often cause cavitation, or rapid release of gas bubbles, and readings both up and downstream may show much higher velocity. As a guideline, mount the sensor at least 20 diameters upstream or 30 diameters downstream from velocity increasing devices.

Required distance from a velocity increasing device will vary in applications depending on the flow velocity and the characteristics of the liquid itself.



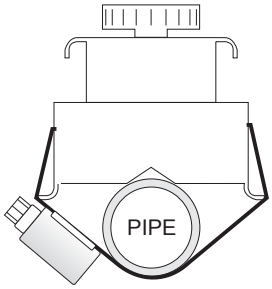
TURBULENCE INCREASING DEVICES: Elbows, flanged connections and tees tend to introduce desirable conditions of an evenly distributed flow profile with some air or gases entrained in the flow. Sensor mounting 6 pipe diameters upstream and 10 diameters downstream from these disturbances is generally optimum.

The sensor is designed to mount longitudinally on a straight section of pipe. Do not attempt to mount it on bends, elbows or fittings.

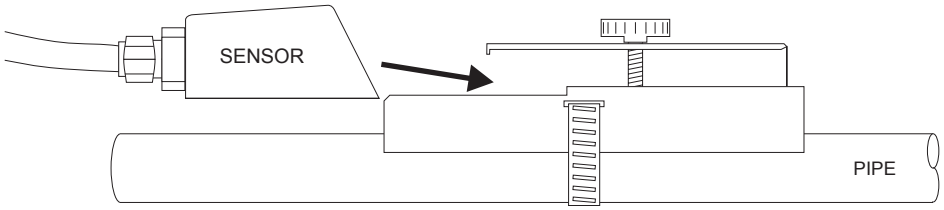
SENSOR MOUNTING

Prepare an area 50mm wide by 100mm long (2" x 4") for sensor bonding by removing loose paint, scale and rust. The objective of site preparation is to eliminate any discontinuity between the sensor and the pipe wall, which would prevent acoustical coupling.

A PC4 Sensor Mounting Kit is supplied with each Micronics flow meter. It includes recommended coupling compound in a plastic applicator and a stainless steel mounting bracket with adjustable pipe straps.

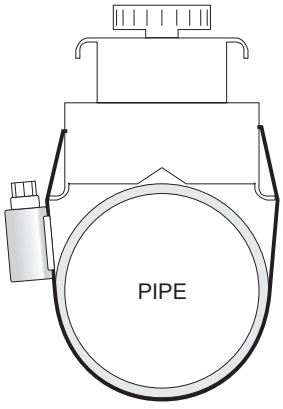


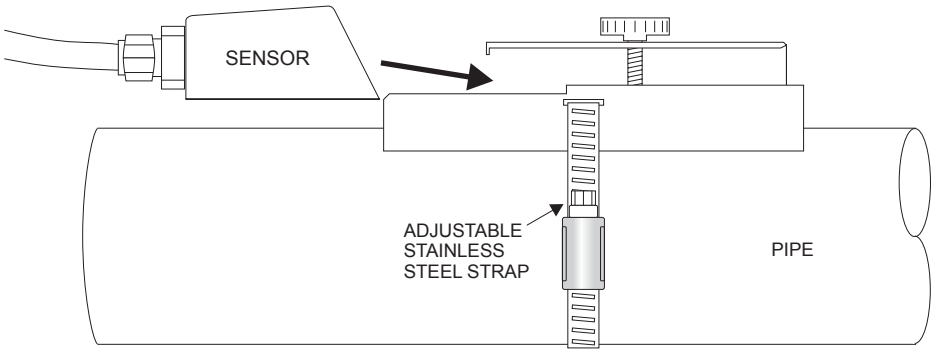
END VIEW



Mount the PC4 pipe clamp as illustrated on pipes 15mm / 0.6" OD or larger. Stainless steel bands are included for mounting on pipes up to 81cm / 32" OD.

Additional stainless steel bands (by customer) may be combined to mount on pipes up to 4.5m / 180" OD.



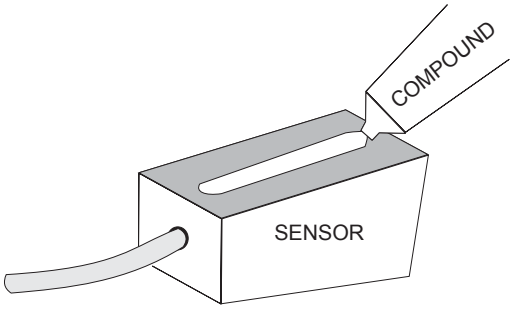


SENSOR COUPLING

For permanent or temporary bonding, the following are recommended:

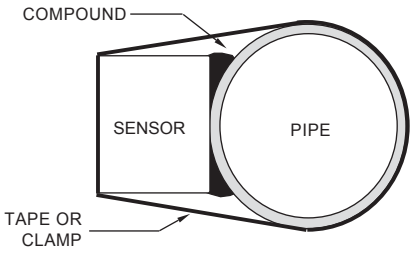
a) Dow Corning silicon compound #4 (supplied)
   Additional supply: order Micronics Option CC
b) High Temperature compound (supplied with Sensor Option SE3H)
   Additional supply: order Micronics Option AP-1W
c) Water-based sonic compound: Order Micronics Option CC30
d) Electrocardiograph gel
e) Petroleum gel (Vaseline)

The above are arranged in their order of preferred application.
d& e are only good for temporary bonding at room temperature.
DO NOT USE: Silicon RTV caulking compound (silicon rubber).



Use the PC4 pipe clamp (supplied) as illustrated above or use a loop of electrical tape for temporary mounting. Apply silicon coupling compound #4 to the coloured face of the sensor. A bead, similar to toothpaste on a toothbrush, is ideal. Do not overtighten (crush the sensor).

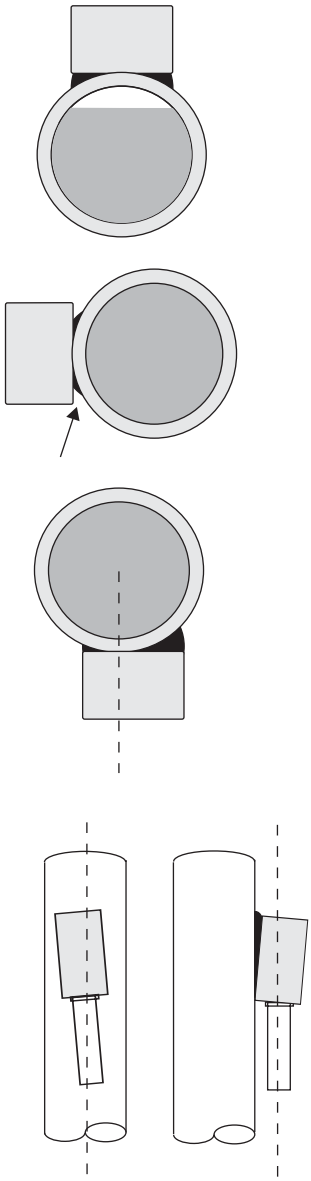
The sensor must be fixed securely to the pipe with coupling material between the sensor face and the pipe. Sensor installation with excessive coupling compound can result in gaps or voids in the coupling and cause errors or loss of signal. Insufficient coupling compound will create similar conditions.



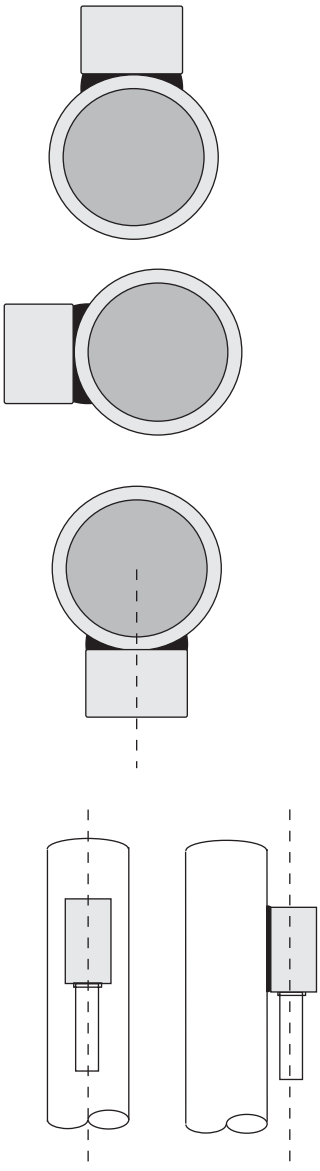
Over time temporary coupling compounds (e.g. Petroleum Gel) may gradually sag away from the sensor resulting in reduced signal strength and finally complete loss of signal. Warm temperatures, moisture and vibration will accelerate this process. Dow Corning Silicone Compound #4 as supplied with the UF D5000 (and available from Micronics Limited) is recommended for semi-permanent installations.

SENSOR MOUNTING/COUPLING RECOMMENDATIONS

BAD



GOOD



ENCLOSURE INSTALLATION

Locate the enclosure within 6m (20 ft) of the sensor (500 ft -150 m optional). The enclosure can be wall mounted with the four mounting screws (included) or panel mounted with Option PM Panel Mount kit from Micronics Limited.

Avoid mounting the enclosure in direct sunlight to protect the electronics from damage due to overheating and condensate. In high humidity atmospheres, or where temperatures fall below freezing, Option TH Enclosure Heater and Thermostat is recommended. Seal conduit entries to prevent moisture from entering enclosure.

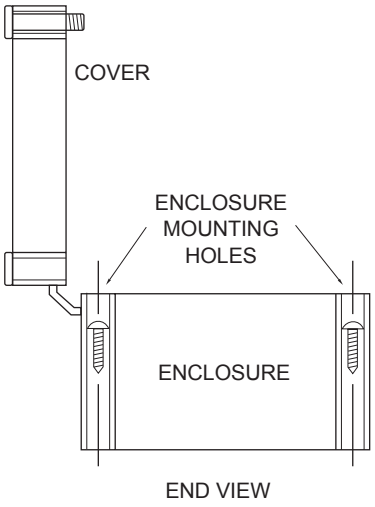
NEMA4X (IP66) WITH CLEAR COVER

1. Open hinged enclosure cover.

2. Insert #8 screws (supplied) through the four enclosure mounting holes to secure the enclosure to the wall or mounting stand.

Additional conduit holes can be cut in the bottom of the enclosure when required. Use a hole saw or Greenlee-type hole cutter to cut the required holes.

DO NOT make conduit/wiring entries into the top of the enclosure.



Note: This non-metallic enclosure does not automatically provide grounding between conduit connections. Grounding must be provided as part of the installation. Ground in accordance with the requirements of the National Electrical Code. System grounding is provided by connecting grounding wires from all conduit entries to the steel mounting plate or another point which provides continuity.

CLEANING

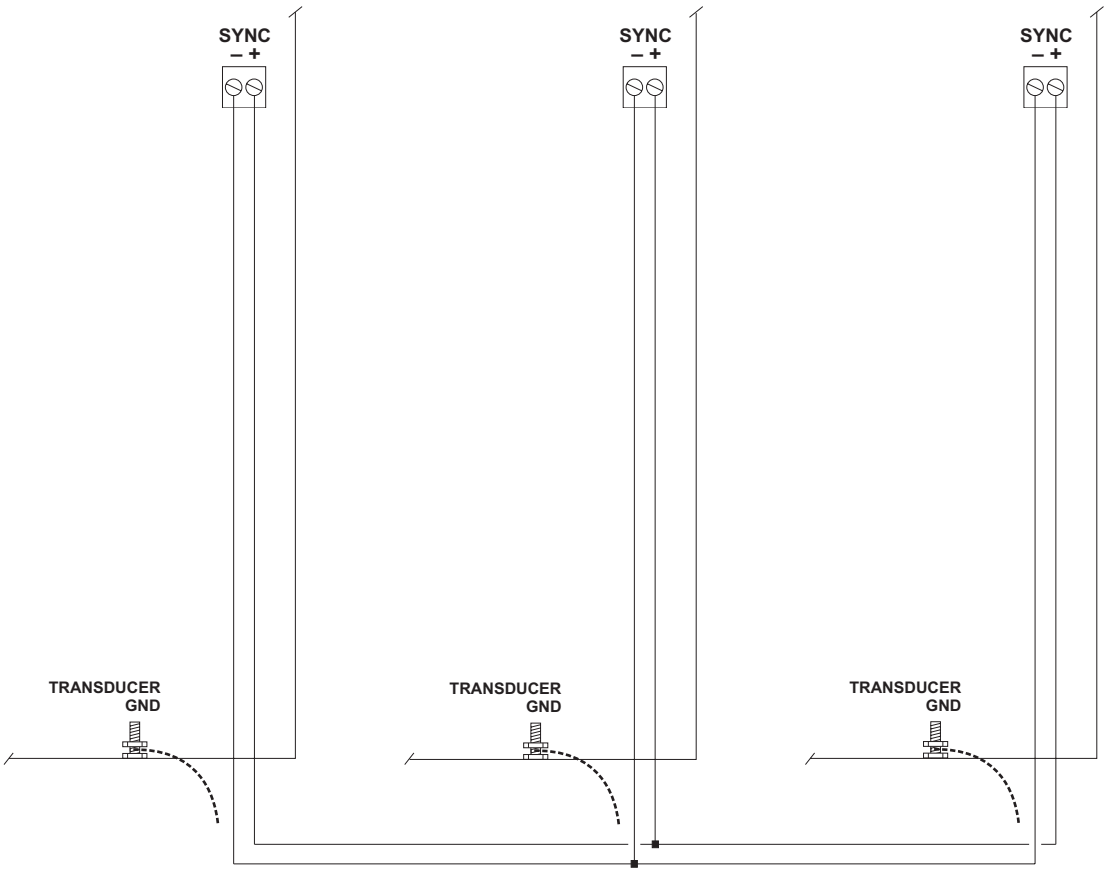
Cleaning is not required as a part of normal maintenance.

SYNCHRONIZATION

Synchronization may be required to prevent interference (readings with no flow or "cross talk") in applications where more than one UF D5000 Doppler sensor is used in close proximity. Synchronize UF D5000 flow meters only if sensors from separate UF D5000 flow meters are mounted on the same pipe.

To synchronize one or more UF D5000 flow meters use twisted, shielded pair cable, 22AWG or heavier. Connect SYNC + of one UF D5000 to the SYNC + of the next unit. And connect SYNC - of one UF D5000 to the SYNC - of the next unit, etc. Connect shield to Transducer GND on all units as illustrated below.

No changes in UF D5000 hardware setup or software are required. The instruments manage synchronization connections automatically.



FIELDTROUBLESHOOTING

Possible Causes:	*Corrective Action:*
METER READING LOWER THAN EXPECTED	
Calibration Error	Review UNITS/MODE menu andPipe ID
Lower flow rate than expected	Investigate pump/valves. Compare velocity with alternate instrument
Signal not penetrating far enough into the flow stream	Relocate sensor closer to elbows or flow disturbances
Improper mounting of sensor	Reinstall Sensor with careful application of Coupling Compound
Pipe is not full	Remount Sensor on vertical pipe
METER READING WHEN THERE IS NO FLOW	
Vibration on pipe	Adjust Status / Signal Cutoff setting Install in another location
Local electrical noise	Ensure all Flowmeter wiring is in METAL conduit and sensor shield is properly grounded. Ensure correct power input Ground connection (<1 ohm resistance). Ensure 4-20mA Shield connected to Instrument Ground stud.
Cross talk between two or more UF D5000 flowmeters on same pipe	Refer to Synchronization instructions
Variable Speed Drive interference	Follow Drive manufacturers wiring and Grounding instructions Relocate Flowmeter electronics, Sensor and wiring away from VSD
Sensor cable connections incorrect or loose	Refer to Connections diagram. Disconnect and

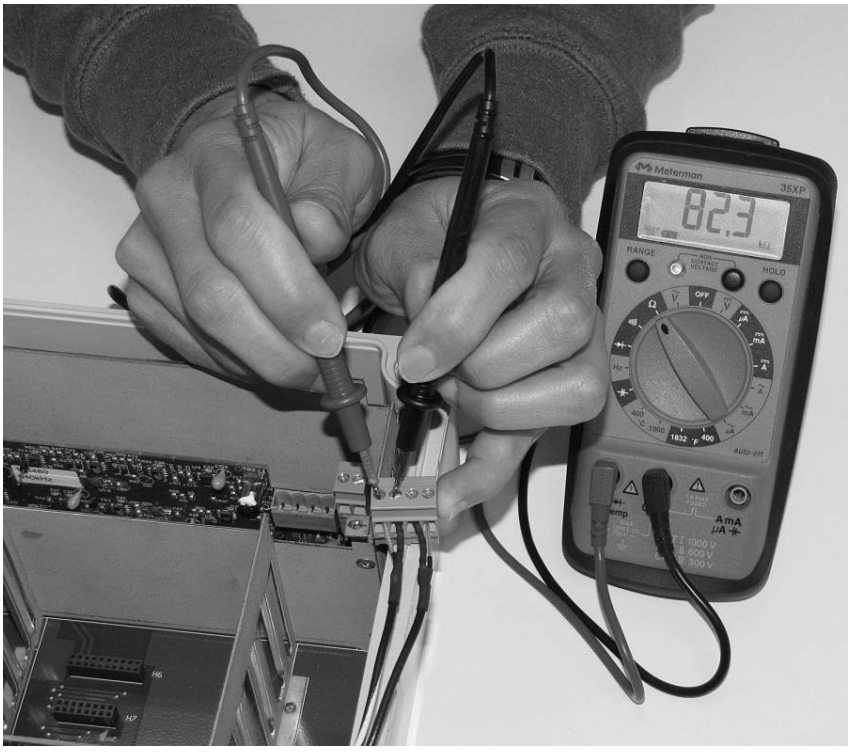
Possible Causes:	*Corrective Action:*
	reconnect sensor cables ensuring that cable is properly inserted into terminals and tightened.
METER READING ERRATIC	
Sensor mounted too close to valve, pump or elbow	Change sensor placement. Recommended 6-10 diameters from elbows, and 30 diameters from pumps, controlling valves, orifice plates, nozzles or open pipe discharge
NO FLOW INDICATION	
Not enough suspended particles or gases in the fluid	Relocate sensor in more turbulent pipe section. Mount sensor at 12 o'clock position on horizontal pipe
Coupling compound washed out, or sensor loose on pipe	Remount sensor Use Dow Corning Silicone #4
Power interruption. No flow.	Check fuse/breaker. Confirm flow
METER READING TOO HIGH	
Calibration error	Review UNITS/MODEmenu andPipe ID
Vibration or noise on the pipeline	Install in another location.
Pipe is not full	Remount Sensor on vertical pipe
Nearby velocity increasing device (pump, valve, orifice plate)	Relocate sensor >30 pipe diameters from velocity increasing device
Local electrical noise	Ensure all Flowmeter wiring is in METAL conduit and sensor cable shield is connected to Ground stud
Variable Speed Drive interference	Follow Drive manufacturers wiring and Grounding instructions

Possible Causes:	*Corrective Action:*
	Relocate Flowmeter electronics, Sensor and wiring away from VSD
METER READING DOES NOT TRACK FLOW	
Sensor and GND wires reversed or not properly connected	Check Sensor connections
Improper AC power input Ground	Use direct connection with 12 AWG wire to nearest Ground pole (<1 ohm resistance).

SENSOR CABLE RESISTANCE TEST

Unplug the green sensor terminal from the Doppler board and connect the sensor wires as shown. With a multimeter, perform resistance checks for each set of wires. One single loose terminal may cause false readings.

Test across shield and core of each wire: TMTR (black/white) and RCVR (black). Resistance should be around 82.5K ohms for any cable length. High readings indicate an open circuit and low readings indicate a short or partial short in the sensor cable.



COMMON QUESTIONS AND ANSWERS

The pipe vibrates. Will it affect the flow meter?
Common vibration frequencies are far lower than the sonic frequencies used by the Micronics flow meter, and will not normally affect accuracy or performance. However, applications where very weak Doppler signal is present (when sensitivity is adjusted to maximum and signal strength is low), accuracy may be affected by pipe vibration, or the flow meter may show readings under no-flow conditions. Attempt to relocate the sensor on a pipe section where vibration is reduced, or arrange pipe mounting brackets to reduce vibration at the sensor mounting location.

The flow meter must be installed in a high noise environment. Will this affect operation?
Micronics flow meters are designed to discriminate between environmental noise and the Doppler signal. High noise environments may affect the flow meter's performance where low signal strength and/or low flow velocities are being measured. Relocate the sensor in a more quiet environment if possible.

Will pipe corrosion affect accuracy of the flow meter?
Yes. Rust, loose paint etc. must be removed from the outside of the pipe to provide a clean mounting position when installing a Doppler sensor. Severe corrosion/oxidation on the inside of the pipe may prevent the Doppler signal from penetrating into the flow. If the pipe cannot be cleaned, a spool piece (PVC recommended) should be installed for sensor mounting.

What effect do pipe liners have on the flow meter?
The air gap between loose insertion liners and the pipe wall prevent the Doppler signal from entering the flow. Better results can be expected with bonded liners such as cement, epoxy or tar, however an on site test is recommended to determine if the application is suitable for a Doppler flow meter.

Why is Doppler only recommended for liquids containing suspended solids or gases?
The Doppler sensor transmits sound into the flow stream which must be reflected back to the sensor to indicate flow velocity. Gas bubbles or suspended solids act as reflectors for the Doppler signal. As a guideline, Micronics Doppler flow meters are recommended for liquids containing solids or bubbles with a minimum size of 100 microns and a minimum concentration of 75 ppm. Most applications (except potable, distilled or deionized water) will meet this minimum requirement.

Can the sensor be submerged in water?
Yes, for short periods of time or by accident, but it is not recommended for continuous operation. The sensor is constructed to withstand submersion to 10 psi without damage, but external liquid moving in contact with the sensor can be interpreted as flow and cause false readings.

What is the purpose of the Signal Strength Display?
Doppler signals of very low strength are not accepted or processed by the instrument. This feature assists in rejection of environmental noise and vibration. Use the display to evaluate signal strength in your application. Strong signals will increase in percentage to a maximum of 100% or greater.

Can I change the length of the sensor cable?
Yes. Technological advances in Micronics Doppler design allow cable lengths up to 152m (500 ft) with no loss of signal strength. Extended cable (Micronics Option DXC) should be installed in rigid or flexible conduit for mechanical protection. Use only Micronics shielded coaxial pair (RG174U) cable. Cable junctions should be made through a terminal block and housed in a watertight metal junction box (Micronics Option DJB). BNC coaxial connectors (TV cable type) are not recommended for cable splices.

Does the UF D5000 require periodic recalibration?
No. UF D5000 calibration does not drift over time. The solid state sensor has no moving parts to wear and affect calibration. The Doppler flow technique generates an ultrasonic signal proportional to the velocity of flow. All Micronics timing/counting circuits use crystal-controlled frequency references to eliminate any drift in the processing circuitry.

PRODUCT RETURN PROCEDURE

Instruments may be returned to Micronics for service or warranty repair.

1) Obtain an RMA Number from Micronics -
Before shipping a product to the factory please contact Micronics by telephone, fax or email to obtain an RMA number (Returned Merchandise Authorization). This ensures fast service and correct billing or credit.

When you contact Micronics please have the following information available:

1. Model number / Software Version
2. Serial number
3. Date of Purchase
4. Reason for return (description of fault or modification required)
5. Your name, company name, address and phone number

2) Clean the Sensor/Product -

Important: unclean products will not be serviced and will be returned to the sender at their expense.

1. Rinse sensor and cable to remove debris.

2. If the sensor has been exposed to sewage, immerse both sensor and cable in a solution of 1 part household bleach (Javex, Clorox etc.) to 20 parts water for 5 minutes. Important: do not immerse open end of sensor cable.

3. Dry with paper towels and pack sensor and cable in a sealed plastic bag.

4. Wipe the outside of the enclosure to remove dirt or deposits.

5. Return to Micronics for service.

3) Ship to Micronics -

After obtaining an RMA number please ship the product to the appropriate address below:

Customers:

Micronics Limited.
Knaves Beech Business Centre,
Davies Way, Loudwater,
High Wycombe, Buckinghamshire,
United Kingdom, HP10 9QR

RMA#

FLOW METER DATA SHEET

Micronics

Knaves Beech Business Centre,
Davies Way, Loudwater,
High Wycombe, Buckinghamshire,
United Kingdom, HP10 9QR

Please complete and return this form to Micronics. It is important. We use this information to check our database for performance of Micronics flow meters in similar applications, and to provide advice and recommendations to you. Thanks for your cooperation.

Contact: _____ Title/Dept.: _____
Company: _____ Project: _____
Address: _____
Tel: _____ Fax: _____

SENSOR:
Model/Type: _____ Cable Length: _____
Elec. Class: _____ Type of Pump: _____
Distance from nearest Pump, Controlling Valve, Orifice or open Discharge: _____

INSTRUMENT:
Model/Type: _____ Power Input: _____
Calibrated Range: _____ Indication: _____
Operating Temp.: _____ Alarm: _____
Enclosure Class: _____ Pulse/Unit: _____
Elec. Class: _____ Output: _____

SERVICE CONDITIONS:
Pipe ID: _____ ❑ Vertical ❑ Horizontal
Pipe Mat'l: _____ % Solids: _____
Fluid: _____ Material Build-up: _____
Oper. Flow: _____ Vibration: _____
Max. Flow: _____ Max. Pressure: _____
Min. Flow: _____ Max. Temp: _____

Notes / Sketch Pipe Run:

LIMITED WARRANTY

Micronics warrants, to the original purchaser, its products to be free from defects in material and workmanship for a period of one year from date of invoice. Micronics will replace or repair, free of charge, any Micronics product if it has been proven to be defective within the warranty period. This warranty does not cover any expenses incurred in the removal and re-installation of the product.

If a product manufactured by Micronics should prove defective within the first year, return it freight prepaid to Micronics along with a copy of your invoice.

This warranty does not cover damages due to improper installation or handling, acts of nature, or unauthorized service. Modifications to or tampering with any part shall void this warranty. This warranty does not cover any equipment used in connection with the product or consequential damages due to a defect in the product.

All implied warranties are limited to the duration of this warranty. This is the complete warranty by Micronics and no other warranty is valid against Micronics. Some states do not allow limitations on how long an implied warranty lasts or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

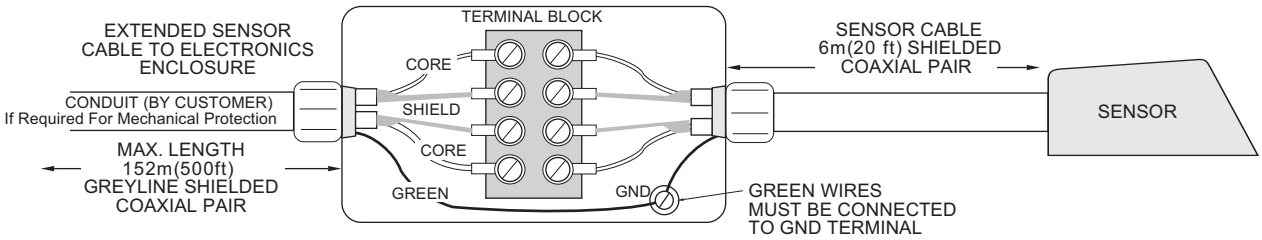
Micronics Limited.

APPENDIX A – OPTIONS

EXTRA SENSOR CABLE (OPTION DXC)

Each Micronics flow meter includes 6m / 20 ft (or 15m / 50 ft optional) continuous shielded coaxial pair cable. Additional cable and Cable Junction Box (Option DJB) may be ordered with the Flow Meter, or the cable may be spliced and extended up to 152m (500 ft) as required during installation. No adjustment is required when the sensor cable is extended or shortened. Use only Micronics shielded coaxial pair (RG174U) cable.

Extended sensor cable should be installed in conduit for mechanical protection. Recommended installation with a metal junction box (Option DJB) is illustrated below:



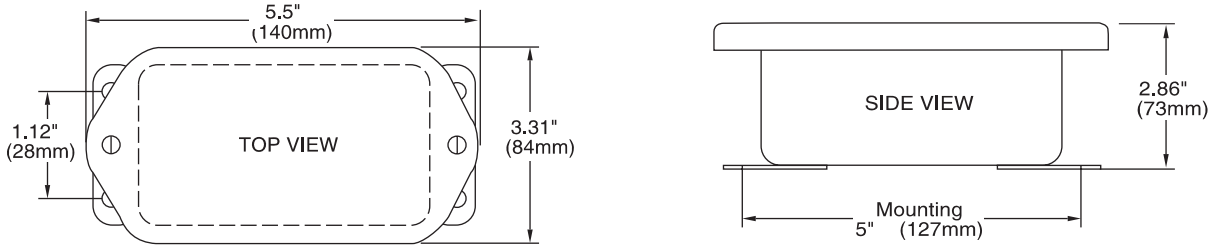
COAXIAL CABLE PREPARATION

DXC Doppler sensor cable can be cut and spliced up to a maximum length of 152m (500 ft). Cable ends must be prepared as illustrated below.

SENSOR CABLE JUNCTION BOX (OPTION DJB)

Optional Watertight steel NEMA4 Junction Boxes with terminal strips are available from Micronics Limited.

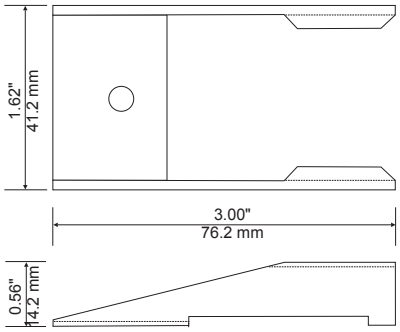
DIMENSIONS
OPTION DJB - JUNCTION BOX



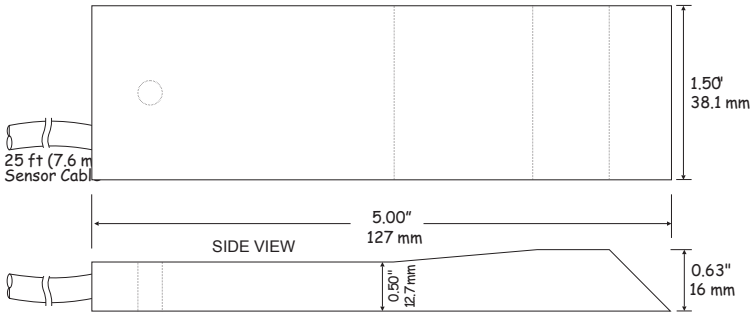
Velocity Sensor QZ02L-B

Minimum Velocity:	0.03 m/sec (0.1 ft/sec)
Maximum Velocity:	6.2 m/sec (20 ft/sec)
Operating Temperature:	-15 to 65°C (5 to 150°F)
Exposed Materials:	PVC, epoxy resin, polyurethane, ultem
Sensor Cable:	25 ft. (7.6 m) submersible polyurethane jacket, shielded, 3 coaxial
Hazardous Rating:	CSA rated Intrinsically Safe Class I, Groups C,D, Class II, Groups E,F,G with optional Intrinsic Safety Barrier

MB-QZ - MOUNTING BRACKET

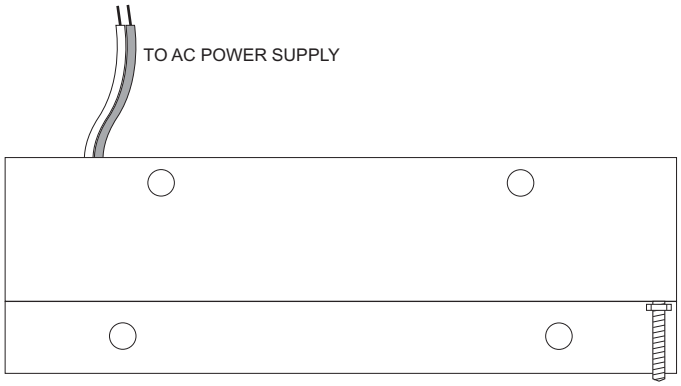


QZ02L-B VELOCITY SENSOR



ENCLOSURE HEATER AND THERMOSTAT - Option TH

Instruments can be factory-equipped with an Enclosure Heater and Thermostat or the module can be customer-installed. The Thermostat is factory set to turn ON at 4.5°C (40°F) and OFF at 15.5°C (60°F). Power consumption is 15 Watts.



ENCLOSURE SUNSCREEN - Option SCR

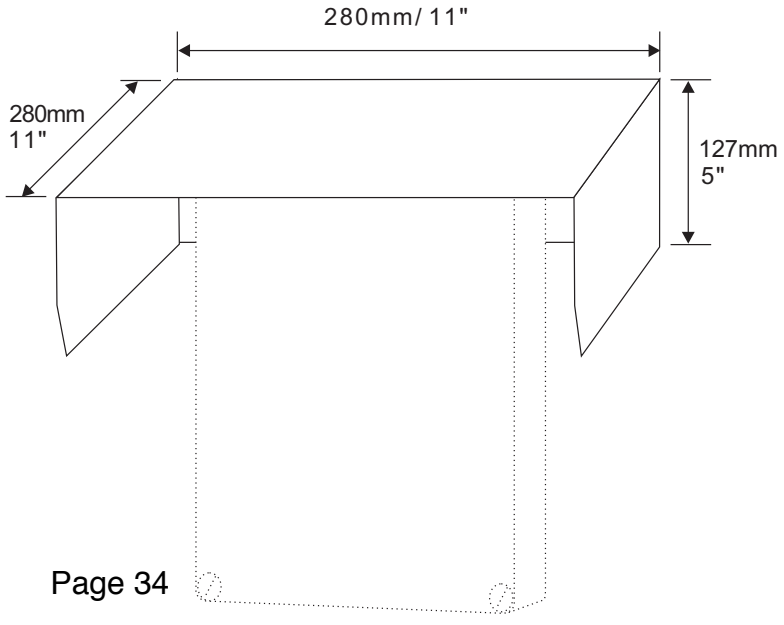
Do not mount instrument electronics in direct sunlight. Overheating will reduce the life of electronic components and condensate may form during the heat/cool cycles and cause electrical shorts.

Note:

Exposure to direct sunlight can cause overheating and moisture condensation which will reduce the operating life of electronics.

Protect Instruments from direct sunlight with this iridite finished aluminum sun screen (Micronics Option SCR).

Seal conduit entries with caulking compound to further reduce moisture condensation.



POWER INPUT OPTION
9-32VDC

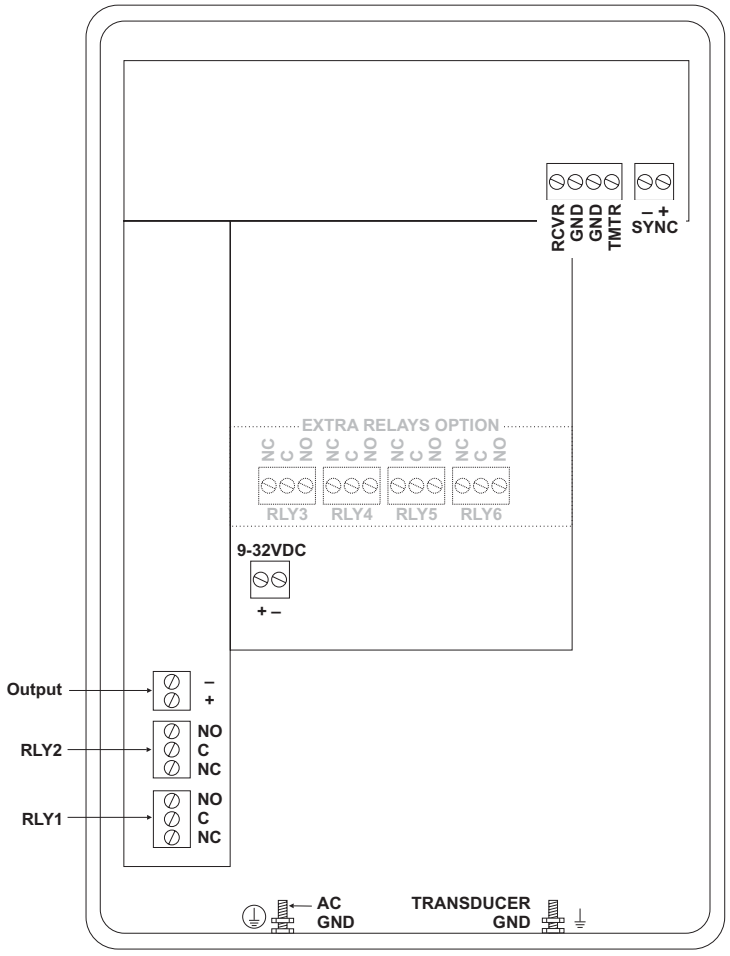
UF D5000 Flow Meters may be ordered factory-configured for 9-32VDC power input.

QUICK BENCH TEST:

Connect Sensor as shown below, then Power. Test operation of the UF D5000 by holding the sensor in one hand and rubbing your thumb or fingers briskly across the face (plastic surface) of the sensor. Allow 15 seconds for the UF D5000 to process the signal and display a flow value.

CONNECTIONS:

POWER INPUT: Connect 9-32VDC to the + and - terminals. The Power Input GND terminal must be connected to the nearest Ground pole. A 1 amp fuse in line is recommended.



```
--Data Logging-------
▸Log Site ID          00
                      99
 Mode              Flow
                Velocity
 Set Date   Feb 18/2008
            Mar 19/2009
 Set Time      11:27:40
               12:28:41
 Interval         10sec
                  60min
                  30min
                  10min
                   5min
                   2min
                   1min
                  30sec
 Log               Stop
                  Start
                 Delete
```

DATA LOGGING(Optional)

Setup

Select Data Loggingfrom Menu Selections.

Log Site ID	Enter a number from 00 to99. The site ID will become part of the downloaded file name to help distinguish downloads from different instruments. Press ✓ to store the setting.
Mode	Select Velocity (e.g. m/sec or ft/sec). Flow(e.g. USGPM or l/sec). Press ✓ to store the setting.
Set Date	Press ⬆ or ⬇ to scroll and select Month, Day and Year. Press ✓ to store the setting.
Set Time	Press ⬆ or ⬇ to select the current time in Hours, Minutes and Seconds. Press ✓ to store the setting.
Interval	Press ⬆ or ⬇ to select the logging interval. Flow rate reading will be stored at each time interval. Press ✓ to store the setting. Note: Press ⬇ to Log➡ and ⬆ or ⬇ to Deleteand ✓ to delete the log file. Press ➡ and ⬆ or ⬇ to Start and ✓ to restart the logger.
Log	Stop,Startor Deletethe log file. Delete old file and start a new log to apply any changes that have been made to the Log Site ID, Mode orInterval.

RETRIEVE LOG FILE

Plug a USB Flash Memory Drive (not supplied by Micronics) into the USB output cable from the instrument. The instrument display will show the message Downloadinguntil the log file is transferred to the memory card and then display Completed. The USB flash drive may be removed.

Download file names will appear in this format:

Tag is set according to the Log Site IDentered in the instrument Data Logging menu.

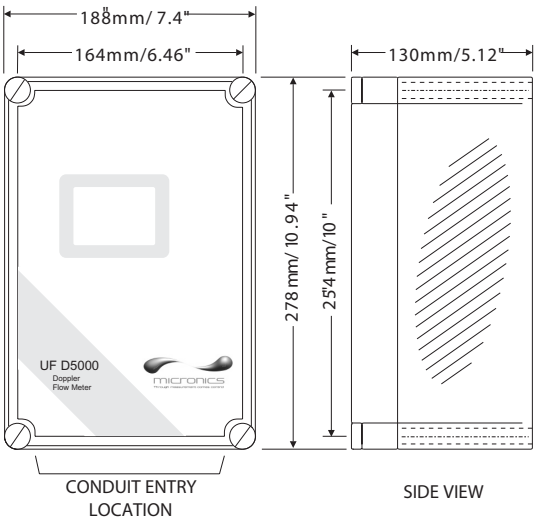
Download letter will be A for the first download from an instrument. B for the second, then C etc. At the letter Z a - character will appear indicating that the maximum number of downloads for that instrument are on the USB flash drive. Older files can be erased or moved from the flash memory drive or a new memory drive can be used.

OPENING LOG FILES

Install Micronics Logger on your PC or laptop. Refer to the Help menu in the program for detailed instructions.

Select File/Open/Instrument Log (.log) to open the log file from your USB flash drive.

SPECIFICATIONS



Flow Rate Range: -12.2 to -0.076 m/sec, +0.076 to +12.2 m/sec, (-40 to -0.25 ft/sec, +0.25 to +40 ft/sec) in most applications

Pipe Size: Any pipe ID from 12.7mm to 4.5 m (" to 180")

Accuracy: ±2% of full scale. Requires solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm. Repeatability: ±0.1%, Linearity ±0.5% of full scale

Displays: White, backlit matrix - displays flow rate, totalizer, relay states, operating mode and calibration menu

Calibration: built-in 5-key calibrator with English, French or Spanish language selection

Power Input: 100-240VAC, 50/60Hz, 30 Watts or 9-32VDC, 9 Watts max

Output: Isolated 4-20mA (1000 ohm load max.)

Control Relays: Qty 2, rated 5 amp 240Vac SPDT, programmable flow alarm and/or proportional pulse

Enclosure: watertight, dust tight NEMA4X (IP66) polycarbonate with a clear shatter-proof face

Environmental Conditions: Relative humidity up to 80% -23 to 60°C ambient temperature, maximum 5000 m altitude, pollution degree 4, Installation Category II.

Sensitivity: adjustable. Damping: adjustable

Electrical Surge Protection: Sensor, 4-20mA output and AC power input

ApproximateShipping Weight: 4.5 kg (10lbs)

SE4 Doppler Sensor

Minimum Pipe Diameter: 12.5 mm (0.5") ID, 15 mm (0.6") OD

Maximum Pipe Diameter: 4.5 m (180") ID

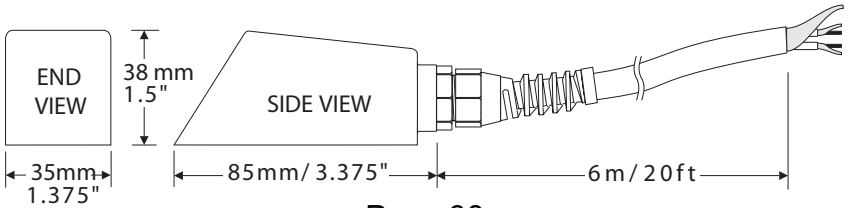
Operating Temperature: -40° to 150°C (-40° to 300°F)

Operating Frequency: 640 KHz

Sensor Housing: Stainless Steel

Sensor Cable: 20 ft. (6 m) shielded coaxial pair (RG174U)
Optional 15m (50ft) or 30m (100ft) continuous

Submersion Rating: Withstands accidental submersion pressure up to 10 psi (0.7 Bar)



APPENDIX B - CONVERSION TABLE

CONVERSION GUIDE		
FROM	TO	MULTIPLY BY
US GALLONS	CUBIC FEET	0.1337
US GALLONS	IMPERIAL GALS	0.8327
US GALLONS	LITRES	3.785
US GALLONS	CUBIC METERS	0.003785
LITRES/SEC	GPM	15.85
LITRES	CUBIC METERS	0.001
BARRELS	US GALLONS	42
BARRELS	IMPERIAL GALS	34.9726
BARRELS	LITRES	158.9886
INCHES	MM	25.4
DEGREES F	DEGREES C	(°F-32) x 0.556
POUNDS	KILOGRAMS	0.453
PSI	BAR	0.0676
FOOT	METER	0.0929

Note: BARRELS are U.S. oil barrels.

PIPE CHARTS

Carbon Steel & PVC Pipe

Pipe	Pipe	Standard Schedule 40		Extra Heavy Schedule 80		Dbl. Extra Heavy		Schedule 10		Schedule 20		Schedule 30		Schedule 40	
Size	O.D.	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL
½	.840	.622	.109	.546	.147	.252	.294							.622	.109
¼	1.050	.824	.113	.742	.154	.434	.308							.824	.113
1	1.315	1.049	.133	.957	.179	.599	.358							1.049	.133
1¼	1.660	1.380	.140	1.278	.191	.896	.382							1.380	.140
1½	1.900	1.610	.145	1.500	.200	1.100	.400							1.610	.145
2	2.375	2.067	.154	1.939	.218	1.503	.436							2.067	.154
2½	2.875	2.469	.203	2.323	.276	1.771	.552							2.469	.203
3	3.500	3.068	.216	2.900	.300	2.300	.600							3.068	.216
3½	4.000	3.548	.226	3.364	.318	2.728	.636							3.548	.226
4	4.500	4.026	.237	3.826	.337	3.152	.674							4.026	.237
5	5.563	5.047	.258	4.813	.375	4.063	.750							5.047	.258
6	6.625	6.065	.280	5.761	.432	4.897	.864							6.065	.280
8	8.625	7.981	.322	7.625	.500	6.875	.875			8.125	.250	8.071	.277	7.981	.322
10	10.750	10.020	.365	9.750	.500	8.750	1.000			10.250	.250	10.136	.307	10.020	.365
12	12.750	12.000	.375	11.750	.500	10.750	1.000			12.250	.250	12.090	.330	11.938	.406
14	14.000	13.250	.375	13.000	.500			13.500	.250	13.376	.312	13.250	.375	13.124	.438
16	16.000	15.250	.375	15.000	.500			15.500	.250	15.376	.312	15.250	.375	15.000	.500
18	18.000	17.250	.375	17.000	.500			17.500	.250	17.376	.312	17.124	.438	16.876	.562
20	20.000	19.250	.375	19.000	.500			19.500	.250	19.250	.375	19.000	.500	18.814	.593
22	22.000	21.250	.375	21.000	.500			21.500	.250	21.250	.375	21.000	.500		
24	24.000	23.250	.375	23.000	.500			23.500	.250	23.250	.375	22.876	.562	22.626	.687
26	26.000	25.250	.375	25.000	.500			25.376	.312	25.000	.500				
28	28.000	27.250	.375	27.000	.500			27.376	.312	27.000	.500	26.750	.625		
30	30.000	29.250	.375	29.000	.500			29.376	.312	29.000	.500	28.750	.625		
32	32.000	31.250	.375	31.000	.500			31.376	.312	31.000	.500	30.750	.625		
34	34.000	33.250	.375	33.000	.500			33.376	.312	33.000	.500	32.750	.625		
36	36.000	35.250	.375	35.000	.500			35.376	.312	35.000	.500	34.750	.625		
42	42.000	41.250	.375	41.000	.500					41.000	.500	40.750	.625		

Ductile Iron Pipe - Standard Classes

Size INCH	OUTSIDE DIA. INCH	Class 50		Class 51		Class 52		Class 53		Class 54		Class 55		Class 56		CEMENT LINING **STD THICKNESS	CEMENT LINING **DOUBLE THICKNESS
		WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.		
3	3.96			0.25	3.46	0.28	3.40	0.31	3.34	0.34	3.28	0.37	3.22	0.41	3.14		
4	4.80			0.26	4.28	0.29	4.22	0.32	4.16	0.35	4.10	0.38	4.04	0.44	3.93		
6	6.90	0.25	6.40	0.28	6.34	0.31	6.28	0.34	6.22	0.37	6.16	0.40	6.10	0.43	6.04	.125	.250
8	9.05	0.27	8.51	0.30	8.45	0.33	8.39	0.36	8.33	0.39	8.27	0.42	8.21	0.45	8.15		
10	11.10	0.39	10.32	0.32	10.46	0.35	10.40	0.38	10.34	0.41	10.28	0.44	10.22	0.47	10.16		
12	13.20	0.31	12.58	0.34	12.52	0.37	12.46	0.40	12.40	0.43	12.34	0.46	12.28	0.49	12.22		
14	15.30	0.33	14.64	0.36	14.58	0.39	14.52	0.42	14.46	0.45	14.40	0.48	14.34	0.51	14.28		
16	17.40	0.34	16.72	0.37	16.66	0.40	16.60	0.43	16.54	0.46	16.48	0.49	16.42	0.52	16.36		
18	19.50	0.35	18.80	0.38	18.74	0.41	18.68	0.44	18.62	0.47	18.56	0.50	18.50	0.53	18.44	.1875	.375
20	21.60	0.36	20.88	0.39	20.82	0.42	20.76	0.45	20.70	0.48	20.64	0.51	20.58	0.54	20.52		
24	25.80	0.38	25.04	0.41	24.98	0.44	24.92	0.47	24.86	0.50	24.80	0.53	24.74	0.56	24.68		
30	32.00	0.39	31.22	0.43	31.14	0.47	31.06	0.51	30.98	0.55	30.90	0.59	30.82	0.63	30.74		
36	38.30	0.43	37.44	0.48	37.34	0.62	37.06	0.58	37.14	0.63	37.04	0.68	36.94	0.73	36.84		
42	44.50	0.47	43.56	0.53	43.44	0.59	43.32	0.65	43.20	0.71	43.08	0.77	42.96	0.83	42.84	.250	.500
48	50.80	0.51	49.78	0.58	49.64	0.65	49.50	0.72	49.36	0.79	49.22	0.86	49.08	0.93	48.94		
54	57.10	0.57	55.96	0.65	55.80	0.73	55.64	0.81	55.48	0.89	55.32	0.97	55.16	1.05	55.00		

**REDUCE I.D. BY DIMENSION SHOWN

Stainless Steel, Hastelloy "C" & Titanium Pipe

Pipe Size	Pipe O.D.	Schedule 5 S (a)		Schedule 10 S (a)		Schedule 40 S		Schedule 80 S	
		I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL
½	.840	.710	.065	.674	.083	.622	.109	.546	.147
¼	1.050	.920	.065	.884	.083	.824	.113	.742	.154
1	1.315	1.185	.065	1.097	.109	1.049	.133	.957	.179
1¼	1.660	1.530	.065	1.442	.109	1.380	.140	1.278	.191
1½	1.900	1.770	.065	1.682	.109	1.610	.145	1.500	.200
2	2.375	2.245	.065	2.157	.109	2.067	.154	1.939	.218
2½	2.875	2.709	.083	2.635	.120	2.469	.203	2.323	.276
3	3.500	3.334	.083	3.260	.120	3.068	.216	2.900	.300
3½	4.000	3.834	.083	3.760	.120	3.548	.226	3.364	.318
4	4.500	4.334	.083	4.260	.120	4.026	.237	3.826	.337
5	5.563	5.345	.109	5.295	.134	5.047	.258	4.813	.375
6	6.625	6.407	.109	6.357	.134	6.065	.280	5.761	.432
8	8.625	8.407	.109	8.329	.148	7.981	.322	7.625	.500
10	10.750	10.482	.134	10.420	.165	10.020	.365	9.750	.500
12	12.750	12.438	.156	12.390	.180	12.000	.375	11.750	.500
14	14.000	13.688	.156	13.624	.188				
16	16.000	15.670	.165	15.624	.188				
18	18.000	17.670	.165	17.624	.188				
20	20.000	19.634	.188	19.564	.218				
22	22.000	21.624	.188	21.564	.218				
24	24.000	23.563	.218	23.500	.250				

Pipe Size	Pipe O.D.	Schedule 60		Schedule 80		Schedule 100		Schedule 120		Schedule 140		Schedule 160	
		I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL
½	.840			.546	.147							.466	.187
¼	1.050			.742	.154							.614	.218
1	1.315			.957	.179							.815	.250
1¼	1.660			1.278	.191							1.160	.250
1½	1.900			1.500	.200							1.338	.281
2	2.375			1.939	.218							1.689	.343
2½	2.875			2.323	.276							2.125	.375
3	3.500			2.900	.300							2.624	.438
3½	4.000			3.364	.318								
4	4.500			3.826	.337			3.624	.438			3.438	.531
5	5.563			4.813	.375			4.563	.500			4.313	.625
6	6.625			5.761	.432			5.501	.562			5.189	.718
8	8.625	7.813	.406	7.625	.500	7.439	.593	7.189	.718	7.001	.812	6.813	.906
10	10.750	9.750	.500	9.564	.593	9.314	.718	9.064	.843	8.750	1.000	8.500	1.125
12	12.750	11.626	.562	11.376	.687	11.064	.843	10.750	1.000	10.500	1.125	10.126	1.312
14	14.000	12.814	.593	12.500	.750	12.126	.937	11.814	1.093	11.500	1.250	11.188	1.406
16	16.000	14.688	.656	14.314	.843	13.938	1.031	13.564	1.218	13.124	1.438	12.814	1.593
18	18.000	16.500	.750	16.126	.937	15.688	1.156	15.250	1.375	14.876	1.562	14.438	1.781
20	20.000	18.376	.812	17.938	1.031	17.438	1.281	17.000	1.500	16.500	1.750	16.064	1.968
22	22.000	20.250	.875	19.750	1.125	19.250	1.375	18.750	1.625	18.250	1.875	17.750	2.125
24	24.000	22.064	.968	21.564	1.218	20.938	1.531	20.376	1.812	19.876	2.062	19.314	2.343

Cast Iron Pipe - ASA Standard

Pipe	Pipe	Class 50		Class 100		Class 150		Class 200		Class 250		Class 300		Class 350	
Size	O.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.	WALL	I.D.
3	3.96	0.32	3.32	0.32	3.32	0.32	3.32	0.32	3.32	0.32	3.32	0.32	3.32	0.32	3.32
4	4.80	0.35	4.10	0.35	4.10	0.35	4.10	0.35	4.10	0.35	4.10	0.35	4.10	0.35	4.10
6	6.90	0.38	6.14	0.38	6.14	0.38	6.14	0.38	6.14	0.38	6.14	0.38	6.14	0.38	6.14
8	9.05	0.41	8.23	0.41	8.23	0.41	8.23	0.41	8.23	0.41	8.23	0.41	8.23	0.41	8.23
10	11.10	0.44	10.22	0.44	10.22	0.44	10.22	0.44	10.22	0.44	10.22	0.48	10.14	0.52	10.06
12	13.20	0.48	12.24	0.48	12.24	0.48	12.24	0.48	12.24	0.52	12.16	0.52	12.16	0.56	12.08
14	15.30	0.48	14.34	0.51	14.28	0.51	14.28	0.55	14.20	0.59	14.12	0.59	14.12	0.64	14.02
16	17.40	0.54	16.32	0.54	16.32	0.54	16.32	0.58	16.24	0.63	16.14	0.68	16.04	0.68	16.04
18	19.50	0.54	18.42	0.58	18.34	0.58	18.34	0.63	18.24	0.68	18.14	0.73	18.04	0.79	17.92
20	21.60	0.57	20.46	0.62	20.36	0.62	20.36	0.67	20.26	0.72	20.16	0.78	20.04	0.84	19.92
24	25.80	0.63	24.54	0.68	24.44	0.73	24.34	0.79	24.22	0.79	24.22	0.85	24.10	0.92	23.96

Cast Iron Pipe - AWWA Standard

Pipe	Class A 100 Ft. 43 PSIG			Class B 200 Ft. 86 PSIG			Class C 300 Ft. 130 PSIG			Class D 400 Ft. 173 PSIG		
Size	O.D.	WALL	I.D.	O.D.	WALL	I.D.	O.D.	WALL	I.D.	O.D.	WALL	I.D.
3	3.80	0.39	3.02	3.96	0.42	3.12	3.96	0.45	3.06	3.96	0.48	3.00
4	4.80	0.42	3.96	5.00	0.45	4.10	5.00	0.48	4.04	5.00	0.52	3.96
6	6.90	0.44	6.02	7.10	0.48	6.14	7.10	0.51	6.08	7.10	0.55	6.00
8	9.05	0.46	8.13	9.05	0.51	8.03	9.30	0.56	8.18	9.30	0.60	8.10
10	11.10	0.50	10.10	11.10	0.57	9.96	11.40	0.62	10.16	11.40	0.68	10.04
12	13.20	0.54	12.12	13.20	0.62	11.96	13.50	0.68	12.14	13.50	0.75	12.00
14	15.30	0.57	14.16	15.30	0.66	13.98	15.65	0.74	14.17	15.65	0.82	14.01
16	17.40	0.60	16.20	17.40	0.70	16.00	17.80	0.80	16.20	17.80	0.89	16.02
18	19.50	0.64	18.22	19.50	0.75	18.00	19.92	0.87	18.18	19.92	0.96	18.00
20	21.60	0.67	20.26	21.60	0.80	20.00	22.06	0.92	20.22	22.06	1.03	20.00
24	25.80	0.76	24.28	25.80	0.89	24.02	26.32	1.04	24.22	26.32	1.16	24.00
30	31.74	0.88	29.98	32.00	1.03	29.94	32.40	1.20	30.00	32.74	1.37	30.00
36	37.96	0.99	35.98	38.30	1.15	36.00	38.70	1.36	39.98	39.16	1.58	36.00
42	44.20	1.10	42.00	44.50	1.28	41.94	45.10	1.54	42.02	45.58	1.78	42.02
48	50.50	1.26	47.98	50.80	1.42	47.96	51.40	1.71	47.98	51.98	1.96	48.06
54	56.66	1.35	53.96	57.10	1.55	54.00	57.80	1.90	54.00	58.40	2.23	53.94
60	62.80	1.39	60.02	63.40	1.67	60.06	64.20	2.00	60.20	64.82	2.38	60.06
72	75.34	1.62	72.10	76.00	1.95	72.10	76.88	2.39	72.10			
84	87.54	1.72	84.10	88.54	2.22	84.10						

Pipe	Class E 500 Ft. 217 PSIG			Class F 600 Ft. 260 PSIG			Class G 700 Ft. 304 PSIG			Class H 800 Ft. 347 PSIG		
Size	O.D.	WALL	I.D.	O.D.	WALL	I.D.	O.D.	WALL	I.D.	O.D.	WALL	I.D.
6	7.22	0.58	6.06	7.22	0.61	6.00	7.38	0.65	6.08	7.38	0.69	6.00
8	9.42	0.66	8.10	9.42	0.71	8.00	9.60	0.75	8.10	9.60	0.80	8.00
10	11.60	0.74	10.12	11.60	0.80	10.00	11.84	0.86	10.12	11.84	0.92	10.00
12	13.78	0.82	12.14	13.78	0.89	12.00	14.08	0.97	12.14	14.08	1.04	12.00
14	15.98	0.90	14.18	15.98	0.99	14.00	16.32	1.07	14.18	16.32	1.16	14.00
16	18.16	0.98	16.20	18.16	1.08	16.00	18.54	1.18	16.18	18.54	1.27	16.00
18	20.34	1.07	18.20	20.34	1.17	18.00	20.78	1.28	18.22	20.78	1.39	18.00
20	22.54	1.15	20.24	22.54	1.27	20.00	23.02	1.39	20.24	23.02	1.51	20.00
24	26.90	1.31	24.28	26.90	1.45	24.00	27.76	1.75	24.26	27.76	1.88	24.00
30	33.10	1.55	30.00	33.46	1.73	30.00						
36	39.60	1.80	36.00	40.04	2.02	36.00						

Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.

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